



PPPF Panel Meeting

CAHILLCONSULTING, L.L.C.



GENEDGE

Ex Scientia Tridens, '83

Leveraging Program Funds for Prototype Installations

CahillConsulting, LLC
A GENEDGE Alliance Member

October 10, 2019

DISCLAIMER - Opinions and conclusions here-in are those of the presenter and do not reflect opinions, policies or acknowledgments by any shipyards or government agencies



Agenda

- Recap of Shipbuilding R&D funding needs and streams
 - Pros and Cons
- Direct Program Support – PEO Carriers/NNS/GENEDGE Cooperative Agreement
- NIST-DoD Inter-Agency Agreement (IAA)
- Targeted Near-COTS Technology Insertion Examples
 - Plate Edge Blaster
 - Gantry Mounted Induction Pre-Heating
- How to get involved



R&D Funding Needs

- CVN-80 and other new build programs face challenges to:
 - Lower costs
 - Reduce cycle times and increase throughput
 - Improve first pass quality
 - Incorporate new materials, designs and processes
- Support and assistance is available through a number of programs
- MANTECH, NSRP and SBIR/STTR provide a “first line” of funding for development - but typically NOT implementation
- Program Office Cooperative Agreement provides direct technical support for implementation
- New Inter Agency Agreement (IAA) provides funding for prototype installation and production testing of high impact technologies



Navy Centers of Excellence

The centers function to:

- Execute projects and manage project teams
- Provide corporate expertise in technological areas
- Collaborate with acquisition program offices and industry to identify and resolve manufacturing issues
- Develop and demonstrate manufacturing technology solutions for identified naval requirements
- Provide consulting services to naval industrial activities and industry
- Facilitate transfer of developed technologies

The program currently has seven centers engaged in ManTech activities. Centers and their corresponding core competencies as follows:

- ❖ Composites Manufacturing Technology Centers (CMTC)
- ❖ Electro-Optics Center (EOC)
- ❖ Electronics Manufacturing Productivity Facility (EMPF)
- ❖ Energetics Manufacturing Technology Center (EMTC)
- ❖ Institute for Manufacturing and Sustainment Technologies (iMAST)
- ❖ Navy Metalworking Center (NMC)
- ❖ Naval Shipbuilding and Advanced Manufacturing System (NSAM)

<https://www.onr.navy.mil/en/work-with-us/navy-mantech/navy-mantech-center-excellence>



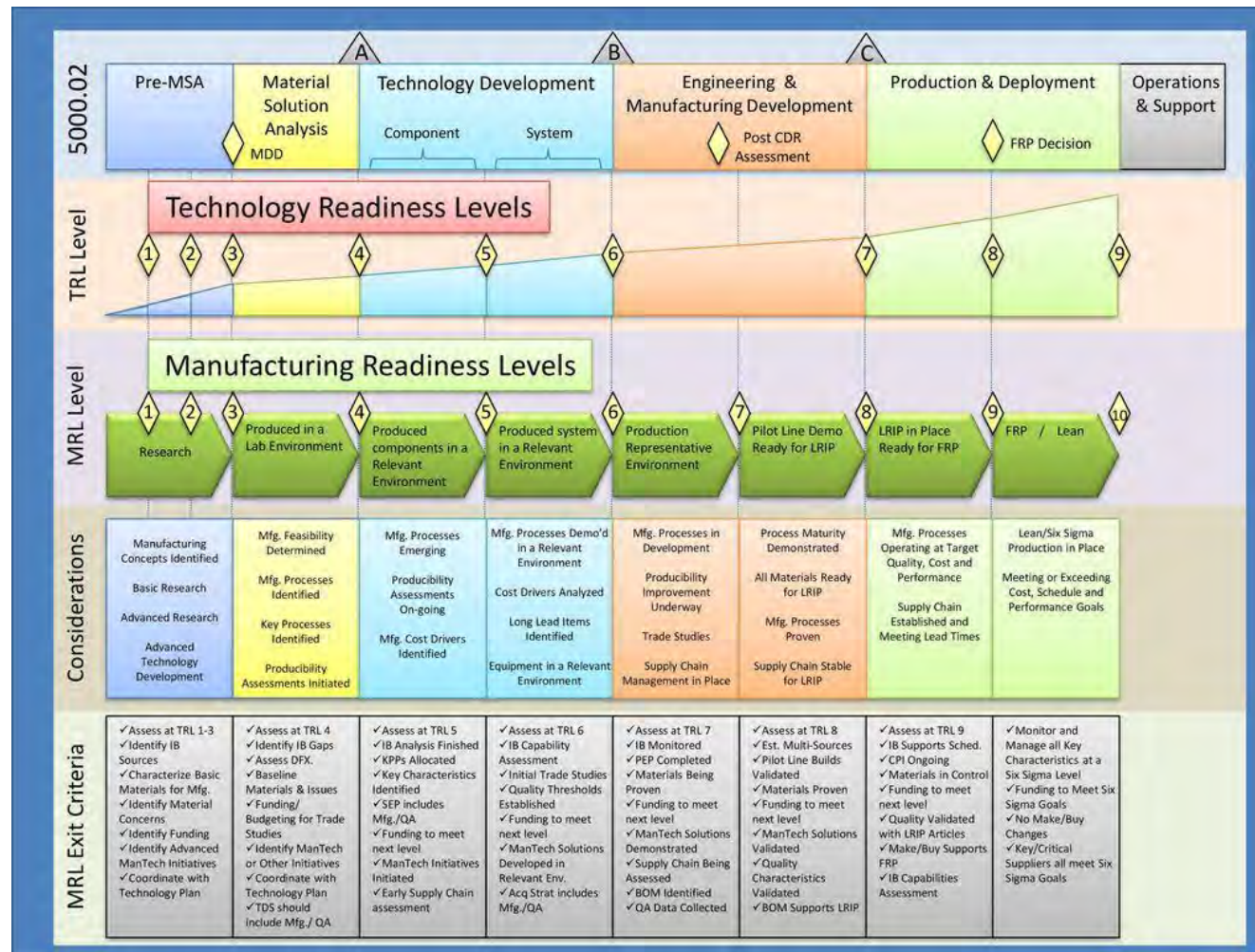
MANTECH Pros and Cons

➤ Pros

- MANTECH provides funding for technology development, typically stopping at a TRL 7
- COEs provide technical expertise and assistance
- Major program contractors have access to annual appropriations

➤ Cons

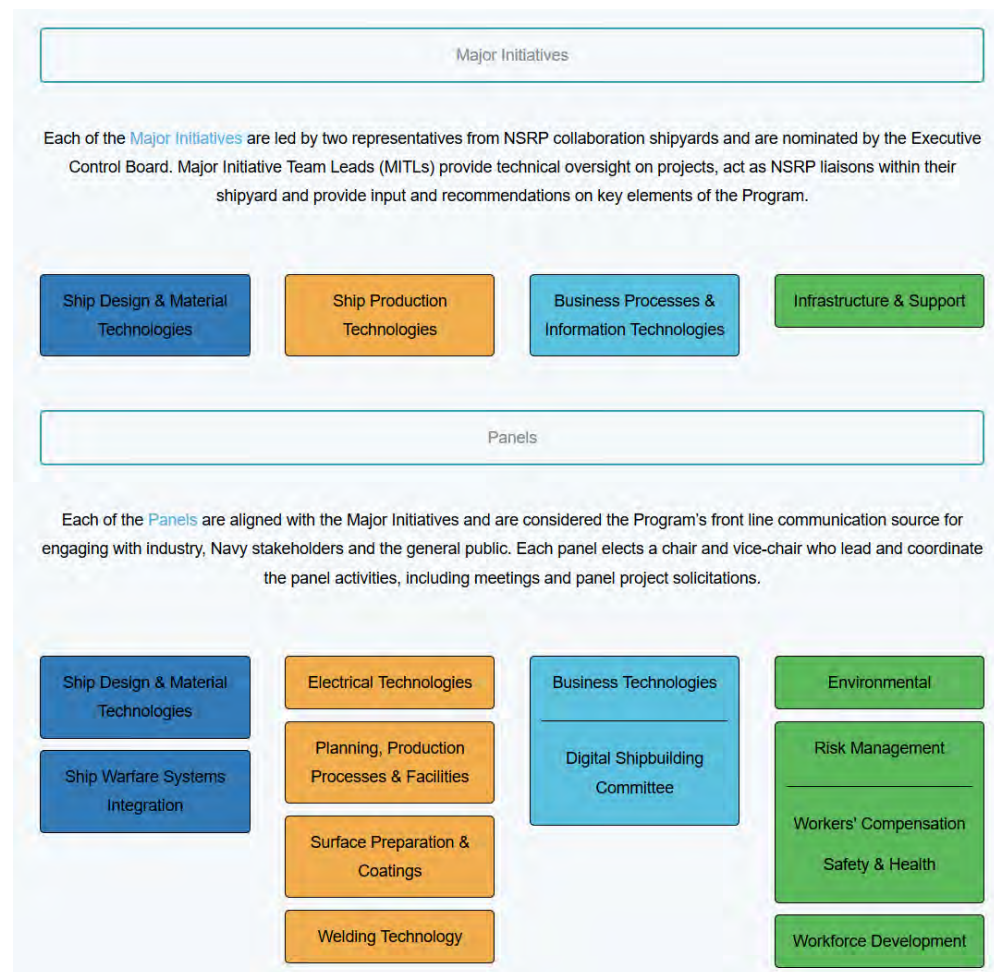
- MANTECH cannot pay for hardware or software installations at the shipyard
- COEs often absorb the majority of the program funds
- Majority of project funding is directed at major contractors





National Shipbuilding Research Program (NSRP)

- NSRP is a joint Navy and shipyard partnership to perform and fund manufacturing technology development
- Pros
 - NSRP funding is available to all shipyards and suppliers on a competitive basis
 - NSRP funding can take TRL 6 technologies to an MRL 7-9
 - RA projects can fund substantial projects
- Cons
 - NSRP funding can take TRL 6 technologies to an MRL 7-9
 - NSRP has limited ability to purchase and install production ready hardware
 - Highly competitive program



<https://www.nsrp.org/organization/>



SBIR/STTR

➤ What is the DOD SBIR/STTR Program?

- The Small Business Innovation Research (SBIR) and the Small Business Technology Transfer Program (STTR) programs are highly competitive government-funded contracts or grants that encourage domestic small businesses to engage in Federal Research/Research and Development (R/R&D) that has the potential for commercialization. The recipient projects must have the potential for commercialization and must meet specific U.S. Government R&D needs. These needs are advertised during three Announcements each year. You must be a small business that meets certain qualifications in order to be eligible for this program.

➤ Pros

- Funding is specifically set aside for small businesses
- Allows development from TRL0 to full commercialization through a phased process
- Allows sole source contracting for SBIR/STTR developed technologies and products
- Provides avenue for shipyards to meet small business supplier goals

➤ Cons

- Extended time from Phase I (proof of concept) to Phase 3 (commercialization)
- Funding limited for Phase I (~\$100L) and Phase II (<\$1M)
- Highly competitive program



MARAD Small Shipyard Grants

In 1994 the Maritime Act of 1920 “Jones Act” was amended to allow for subsidizing commercial shipbuilding through a grant program that specifically defined Advanced Shipbuilding Technology and Modern Shipbuilding Technology

- (c) Advanced Shipbuilding Technology means:
 - (1) Numerically controlled machine tools, robots, automated process control equipment, computerized flexible manufacturing systems, associated computer software, and other technology for improving shipbuilding and related industrial production which advance the state-of-the-art; and
 - (2) Novel techniques and processes designed to improve shipbuilding quality, productivity, and practice, and to promote sustainable development, including engineering design, quality assurance, concurrent engineering, continuous process production technology, energy efficiency, waste minimization, design for recyclability or parts reuse, inventory management, upgraded worker skills, and communications with customers and suppliers.
- (q) Modern Shipbuilding Technology means the best available proven technology, techniques, and processes appropriate to enhancing the productivity of shipyards.

Federal Register Vol 59, No 62, Thursday March 31, 1994, pp 15123-15133



Navy-NIST IAA

- Inter Agency Agreement allows transfer of funds from one government department to another
- NAVY-NIST IAA allows transfer of funds from DoD to DoC
 - Executed at the Program Office level for Navy and by state Manufacturing Extension Partnerships (MEP) for NIST
- Pros
 - Uses Commerce Acquisition Regulations (CAR) instead of Defense Federal Acquisition Regulation Supplement (DFARS)
 - Allows the program office to purchase, install and “abandon in place” near COTS hardware and technologies
 - Provides streamlined access to NIST resources and technologies
 - Provides a means to “jump the line” in capital requests deemed more urgent by the Program Office
- Cons
 - Requires commitment from shipyard to fully invest in successful prototypes
 - Requires a shift of Program R&D funds
 - Requires full engagement and commitment from Navy, Shipyard and NIST



Navy-NIST IAA

- Navy-NIST MEP Inter Agency Agreement (IAA) has been approved to allow transfer of funds from PEO Carriers to NIST
- The NIST MEP program has specific authorities for the identification and insertion of new technologies into manufacturing and industry, which is barred under DFARS
- NIST allocates funds to the GENEDGE MEP with a minimal service fee
- GENEDGE identifies technology solutions and providers with shipyard input, prepares solicitations, reviews responses, awards contract and oversees work
- GENEDGE contracting cycle time is exponentially faster than any other available route to implement the same technology, including internal shipyard processes



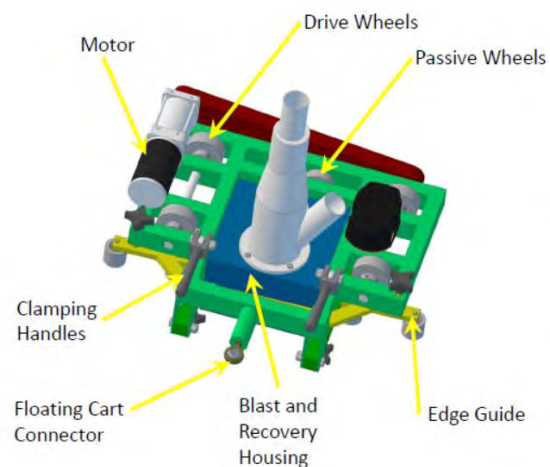
PEO Carriers – GENEDGE IAA

- GENEDGE is the Commonwealth of Virginia MEP
- GENEDGE is also a second tier support contractor to PEO Carriers
 - CahillConsulting, LLC is a third tier contractor under GENEDGE
- GENEDGE has and continues to provide direct MEP support to Newport News Shipbuilding
 - CahillConsulting, LLC provides shipbuilding technologist support
- Cooperative agreement between PEO Carriers, HII-NNS and GENEDGE allows GENEDGE to use program support funds to provide direct support to NNS
- Navy-NIST IAA allows GENEDGE to identify, source, purchase, install, run in production and abandon in place prototype equipment and technologies
 - HII-NNS has committed to purchasing additional units of successful prototypes and include them in future capital requests
- Examples
 - Plate Edge Blaster
 - Atmospheric Plasma Coating Removal
 - Induction coils for preheating



Plate Edge Primer Removal

- Mechanized plate edge blaster
 - Mechanizes an ergonomically horrible job
 - Welding requires primer strip back; currently performed with a hand held blast device
 - Mechanized system will reduce process cycle time from ~2 hrs per plate to 30 minutes
 - Installation next week



- Two driven axles (four wheels)
- Two additional axles with passive wheels to allow running to ends of plate
- Single drive motor
- 12V DC operation (rechargeable battery or optional power supply)
- Adjustable edge guide (self guided)





Plasma Blast Primer Removal

- Recently identified technology developed by Atmospheric Plasma Systems, Cary, NC
- Atmospheric, Non thermal, coupled plasma
 - Uses electromagnetic discharge to ionize air forming a non-thermal plasma beam of monatomic oxygen
 - Oxidizes organic materials, such as paint, and
 - Sonically peens off rust.
- Plan for mounting on portable robot also funded under IAA
- Precision paint removal rather than total paint removal
- Shipboard trials conducted in August

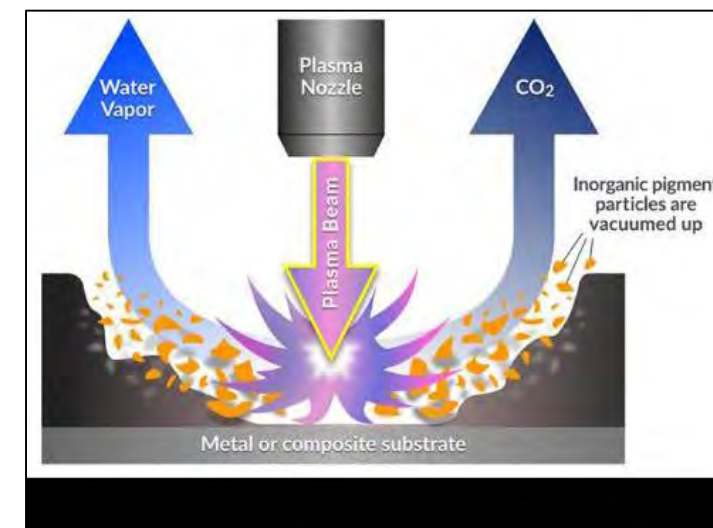
APCR Systems

Handheld plasma pen



PB7000 APCR system

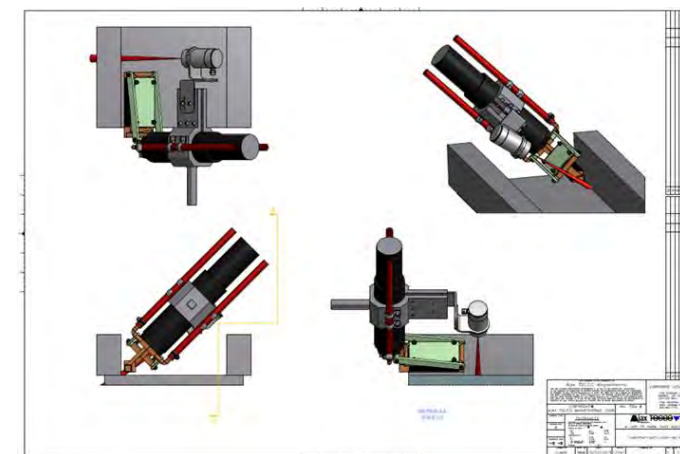
Automated APCR system





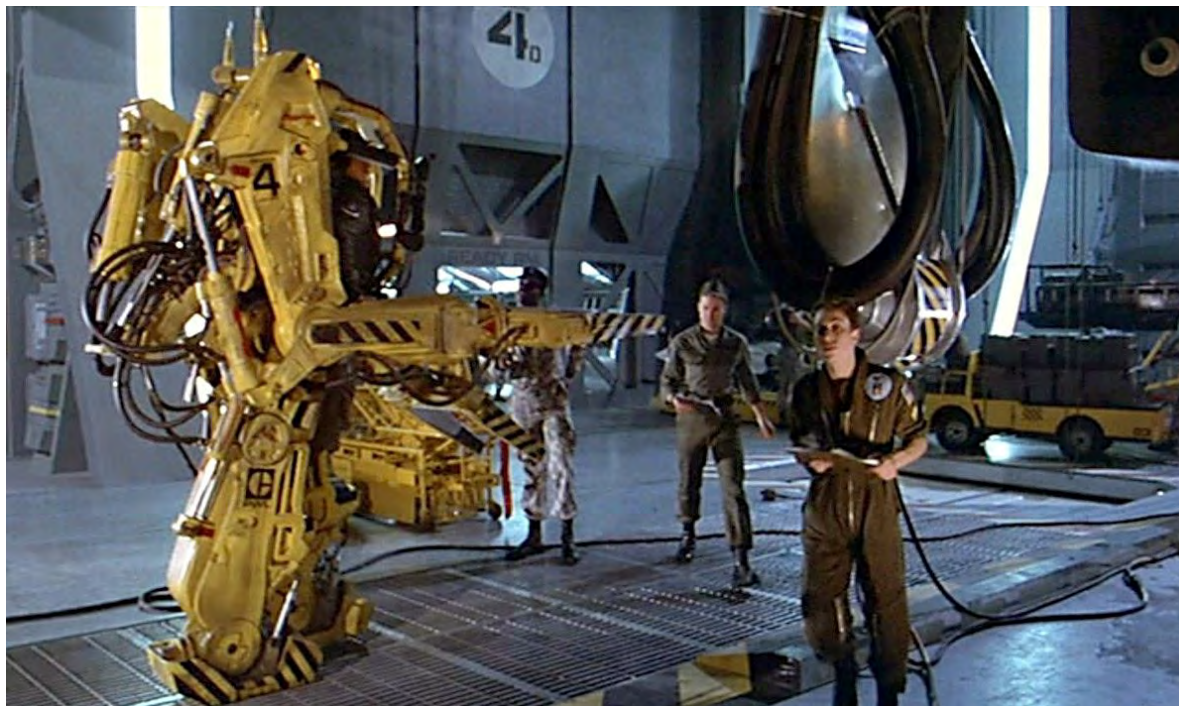
Pre-Heating Time Reduction

- Induction Heating Technology
 - Current process uses resistance heater bars to pre-heat several hundred degrees before fit and weld
 - 4 hours per stiffener for preheat, plus ~ 4 hours fit, tack, weld and clean
 - 8-20 stiffeners per panel
 - Ajax-Tocco gantry mounted induction coil identified as solution
 - Pre-heat time will be reduced from 4 hours to ~45 minutes
 - Doubles throughput of the work station
 - Installation underway





The shipyard of the future



- Boldly going where no welder has gone before

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Thank you!